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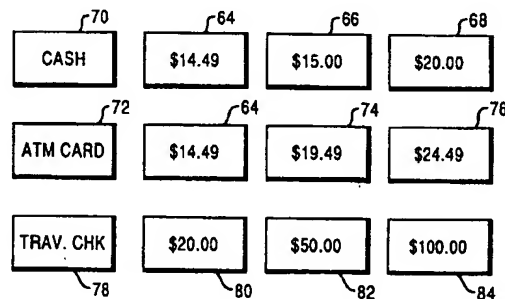
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(54) Apparatus and method for processing payment for a merchandise item.

(57) The invention provides for a merchandise checkout apparatus such as electronic cash register (20) having a touch screen panel (22) and a cash till (26) including a plurality of compartments for storing respective bill and coin denominations, wherein the touch sensitive display screen (22) is arranged to display a receipt (40) listing the merchandise items purchased together with the amount due, a plurality (66,68) of bill denominations which may be submitted by a customer for the purchase of said merchandise items and a representation of said cash till (26) together with the particular bill and coin denominations in the respective compartments of said cash till (26) and the number of such denominations which are to be dispensed as the change to said customer. A method of processing payment with such apparatus is also disclosed.

FIG. 16



The present invention relates to an apparatus and method for processing payment for a merchandise item.

Known point of sale terminal devices include a touch screen, the use of which transfers the function of the keyboard to designated portions of the touch screen. As part of this new development, electronic receipts have been employed which display a list of the items ordered together with functional elements for manipulating the items listed in the receipt. In order for the operators to use these functional elements, more interface objects have been added to the point of sale devices control panel. These interface objects or controls (keys, buttons, knobs, etc.) take up space and are usually laid out close to one another so as to keep most in one location. Until the operators become familiar with the terminal devices control panel layout, much time is spent searching for the appropriate controls. To reduce this search, designers have grouped related buttons, used color coding, etc. Where an electronic receipt is displayed on the touch screen, the size of the typical receipt item is small thereby precluding the use of the human finger as a means to modify the item. At the end of the checkout operation, the total amount of the purchased items is displayed on the touch screen and identified as the payment due by the customer for the purchase of the merchandise items. In most checkout operations the customer will present a currency bill whose denomination is larger than the amount due requiring the operator to enter the payment received from the customer into the terminal device. Upon actuation of a total key on the terminal device, the amount of change due the customer is then displayed requiring the operator to retrieve from the cash drawer located in the data terminal device the number of bills and coins which constitute such change. It is during this payment operation that most of the errors associated with checkout operations are found.

It is therefore an object of the present invention to provide an apparatus and method for processing the payment for a purchased merchandise item which reduces the likelihood of errors occurring.

According to one aspect of the present invention there is provided apparatus for processing the payment for at least one purchased merchandise item comprising display means for displaying the amount due for the purchase of said at least one item, characterized in that said display means is arranged to display a plurality of payment amounts that may be tendered by the customer as payment for said at least one item having regard to the amount due, and in that there are provided means arranged to calculate the amount of change in response to the selection of one of the displayed amounts corresponding to the amount tendered.

Advantageously, the invention provides means for displaying the payment tendered and the change

due, which reduces the number of keystrokes required by the operator in processing the payment of the items purchased by the customer.

According to another aspect of the present invention there is provided a method of processing the payment for at least one purchased merchandise item comprising displaying the amount due for the purchase of said at least one item, characterized by the steps of storing a listing of all the currency denominations available for said payment, dividing said amount due by each currency denomination, adding one to the quotient whenever a remainder is generated as a result of the division, multiplying said denominations by the respective quotient plus one values obtained for each denomination, displaying the products obtained by the multiplication as possible payment amounts that may be tendered by a customer and calculating the amount of change due in response to selection of one of said displayed amounts corresponding to the amount tendered.

An embodiment of the present invention is described further hereinafter, with reference to accompanying drawings in which:

Fig. 1 is a perspective view of a data terminal device embodying the present invention;

Fig. 2 is a block diagram of the touch screen associated with the data terminal device of Fig. 1; Fig. 3 is a diagrammatic representation of an electronic receipt displayed on the touch screen of Fig. 2;

Fig. 4 is another diagrammatic representation of an electronic receipt displayed on the touch screen showing single line items separated by a dotted line together with an item which occupies two lines;

Fig. 5 is yet another diagrammatic representation of a electronic receipt showing one of the items highlighted;

Fig. 6 is a diagrammatic representation of the electronic receipt of Fig. 4 showing the highlighting of one item;

Fig. 7 is a diagrammatic representation of the scrolling buttons and the miscellaneous button superimposed on an electronic receipt;

Fig. 8 is a further diagrammatic representation of an electronic receipt showing the enlargement of a highlighted item generated as a result of touching the miscellaneous button;

Fig. 9 is a diagrammatic representation of an actuated touch screen display showing the location of the electronic receipt together with buttons including transaction buttons, item ordering buttons and multi-function buttons;

Fig. 10 is a diagrammatic representation of a touch screen display generated as a result of touching the arrow portion of one of the multi-function buttons of Fig. 9;

Figs. 11A-11H inclusive are diagrammatic repre-

sensation of an electronic receipt showing the highlighting and the movement of various items on the receipt as a result of pressing the scroll buttons and the adding of an item to the receipt; Fig. 12 is a block diagram of the control unit of Fig. 2 which includes counters, a memory and a microprocessor used in the controlling of the touch screen;

Figs. 13A and 13B are diagrammatic representations of the table found in the memory of the control unit for listing the currency denominations available to be submitted by the customer as payment for the purchased items and dispensed as change due to the customer;

Fig. 14 illustrates one form of the buttons displaying a cash payment amount which may be submitted by the customer in payment of the amount due;

Fig. 15 illustrates another form of the buttons associated with a touch screen display;

Fig. 16 illustrates yet another form of the buttons associated with a touch screen display;

Fig. 17 is an illustration of a touch screen display representing a cash till indicating the location of the specific coin and bill compartments;

Fig. 18 is an illustration of the display of Fig. 17 after a specific dedicated cash payment has been made by the customer indicating the specific bills and coins which are to be removed from the cash till as the change due the customer;

Fig. 19 is an illustration of a display similar to Fig. 18 which is generated after it was found that the ten dollar bill displayed in Fig. 18 was not available;

Fig. 20A and 20B taken together disclose a flow diagram showing the operation of the microprocessor in generating the electronic receipt displays shown in Figs. 11A-11F inclusive;

Fig. 21 is a flow diagram showing the operation of the microprocessor in generating the tendering option displays shown in Figs. 14-16 inclusive; and

Fig. 22 is a flow diagram showing the operation of the microprocessor in generating the change due displays shown in Figs 18 and 19.

Referring now to Fig. 1, there is shown a perspective view of the data terminal device 20 which includes a touch screen panel 22 mounted in a top surface 24 of the terminal device 20, and a cash till 26 which may be secured to the bottom portion of the terminal device 20 or may be remotely positioned adjacent the terminal device.

Referring now to Fig. 2, there is shown a block diagram of the touch screen panel 22 which includes a panel detector unit 34 which senses the location of the operator's finger on the panel 22 and generates electrical signals to represent such location for transmission to a control unit 36 which decodes electrical

signals for actuating the panel to display information in a manner that will be described more fully herein-after. The control unit 36, in response to receiving the electrical signals from the panel detector unit 34, will output control signals to a panel control unit 38 which controls the panel to generate a number of displays for processing the purchased items. One of these displays is the electronic receipt 40 (Figs. 3-11 inclusive) which may list the items ordered by the customer together with the price of the items or any other type of desired information. The control unit 36 may also operate a speaker 42 to generate tone signals representing a successful completion of the reading of the touch screen panel 22 by the control unit 36.

Referring now to Figs. 3-9 inclusive, there are shown diagrammatic representations of the electronic receipts 40 which may be displayed during an operation of the touch screen panel 22. Fig. 3 shows an electronic receipt in which the items 42 are listed together with their prices 43. When certain items take up more than one line or have several components, an item separator such as the dotted lines 44 (Fig. 4) can help to distinguish one item from another item. Where one of the items is required to be modified or changed, it is obvious that using a finger to select one of the items 42 for the modification would be difficult since the items are so narrow that positioning a finger over one of the items would overlap adjacent items. The present invention provides a pair of scroll buttons 46, 48 (Figs. 7, 9, 10 and 11A-11F inclusive) comprising directional arrows superimposed on the receipt 40 which, when touched by the operator, will scroll the contents of the electronic receipt or move a highlight bar 52 (Figs. 11A-11H inclusive) on the receipt. In order to modify a highlighted item such as enlarging an item (Fig. 8), there is superimposed on the electronic receipt between the scroll buttons 48 and 46, a miscellaneous button 50 (Figs. 7, 9, 10 and 11A-11F inclusive,). Where an item is to be highlighted, the use of the scroll buttons 46 and 48 can position a particular item which is to be modified within that highlighted area. Such modifications may include quantity specification, item void, price change, discounts, etc. For example, in order to void the item "large fries" in Fig. 5, the operator may normally be required to press an "item void" key followed by the "large" key and then "fries" keys on the keyboard of a terminal device. This method of modifying an item followed by an item specification can lead to more trouble especially if a particular item needs more than one modification. By utilizing the buttons 46 and 48, the number of keystrokes is reduced thereby increasing the speed of the modification operation.

Referring now to Fig. 9 there is shown a diagrammatic representation of a display 55 on the touch screen panel 22 which includes a plurality of multiple function buttons 56, single function buttons 58, transaction buttons or keys 60 and an electronic receipt 40.

As shown, the electronic receipt 40 includes the balance due 62 for the items ordered. Touching the arrow portion 61 of the multi-function button 56 representing HAMBURGER will result in bringing up the display 63 (Fig. 10) on the panel 22 displaying condiments buttons 65 which may be touched to complete the order.

Referring now to Figs. 11A-11H inclusive, there is illustrated the operation of the present invention in the generation and the moving of the highlight bar 52 through the receipt 40 as a result of touching the scroll buttons 46, 48. The application software for the terminal 20 (Fig. 1) may provide for use of the highlight bar 52 for the receipt as an option. As shown in Figs. 11A and 11B, an item will not be highlighted until it is added to the receipt list. Touching the scroll button 46 will move the highlight bar 52 in an upward direction to highlight items 3-5 (Figs 11C-11E) until it reaches the top of the receipt at which time items listed above ITEM1 in the receipt 40 can move in a downward direction through the highlight bar 52. As items are added or inserted, the position of the highlight bar will change to highlight the last item added or inserted (Figs. 11E-11H).

Referring now to Fig. 12, there is disclosed a block diagram of the control unit 36 (Fig. 2) which includes a microprocessor 170, a memory 172, a denomination counter 174, a button counter 176, a TEMP 1 counter 178 and a TEMP 2 counter 180 which are used in the change due operation using the touch screen panel 22 as will be described more fully hereinafter. Used with the counters 174-180 are tables 182 (Fig. 13A) and 183 (Fig. 13B) which are stored in the memory 172 and controlled by the microprocessor 170. The table 182 includes a column 184 listing all of the currency denominations available for an amount tendering operation while column 184 of table 183 lists all of the currency denominations available for change due operations. Both tables include a corresponding column 186 containing reference numerals identifying corresponding currency denominations used in determining the type of currency which is to make up the customer's payment options and change as will be described more fully hereinafter. The output count of the counter 174 corresponds to the reference numerals listed in column 186 and represent the corresponding currency denomination.

Referring now to Figs. 14-16, there are shown displays on the touch screen panel 22 which may occur during the tendering portion of a checkout operation in which the customer will present currency as payment for the amount due for the purchased items. The displays shown in Figs. 14-16 are based on the premise that most customers will pay for the amount due using one or more of the common denomination bills (1, 5, 10, 20). For example, if the balance due were \$14.49, the most likely payments would be any one of a combination of one dollar bills, five dollar bills

and/or ten dollar bills or even a twenty dollar bill. Therefore based on the amount due, the present invention generates displays which offer logical and likely payment options. Thus for the example shown in Fig. 14, the first display box or button 64 will display the exact amount due (\$14.49). Next comes the one dollar denomination used to calculate the first factor of one greater than the amount due. This amount (fifteen dollars) is used to dynamically label the second display button 66. Next the five dollar denomination is used to calculate the first factor of five greater than the amount due. This amount, also fifteen dollars, has already been listed and will not be listed again. Next the ten dollar denomination is used to calculate the first factor of ten greater than the amount due. This amount (twenty dollars) is used to dynamically label the button 68. It will be seen from this arrangement that the number of keystrokes required of the operator to generate the amount due from the customer as a result of tendering one of the bills displayed in the display buttons 66 and 68 is held to a minimum. Otherwise the operator would have to use the keys on a numeric keyboard associated with the terminal device requiring the actuation of the 2 and the 0 keys together with the subtraction key and the keys representing the amount due for the purchase of the merchandise items.

If a "payment method" specifier is needed to be added, the button 70 (Fig. 15) would be added to the buttons in Fig. 14 illustrating that cash is the payment method. Fig. 16 illustrates other types of payment methods that may be displayed. Thus if an ATM card is presented as payment for the amount due, the buttons associated with the button 72 will be actuated by the operator. Where a traveller's check is presented for the amount due, the button 78 will be actuated by the operator. It will be seen from Fig. 16 that the buttons located on the screen will cover most of the types of payments by the customer that can occur. If the balance due was \$14.49 and the customer pays with a twenty dollar bill, the operator, by touching the button 68, has specified the payment amount together with the payment method as well. If the customer had paid with his/her ATM card and wanted ten dollars back, then the operator would touch the button 76. In a similar manner, the use of a travellers check would result in the touching of the touch screen panel 22 adjacent the specific buttons 80-84 representing the amount of the travellers check. It will be seen that by touching one of the buttons 80-84, the amount tendered and the method of payment will be transmitted to the control unit 36 (Fig. 3) for use in determining the change due to the customer.

Referring now to Fig. 17, there is shown the display 90 which occurs at the same time the displays of Fig. 14-16 occur. The display 90 represents the outline of the cash till 26 (Fig. 1) showing images of the particular coin compartments 92 and the bill compart-

ments 94 with the designated value of the coins and bills which are to be found in each of the compartments. Upon the operator touching one of the buttons 66 or 68 (Figs. 14 and 15), the display 90 will appear as the display 98 (Fig. 18) showing the location and the specific number of the coins and bills which are to be distributed to the customer as the change for the amount submitted by the customer. If a specific bill or coin associated with one of the compartments 92 and 94 in the cash till 26 (Fig. 1) is found to be empty, the operator will touch that particular button in the display 98 (Fig. 18) which results in the generation of a display 100 (Fig. 19) showing the amount of change due which is available to be given to the customer. Thus, as shown in Fig. 19, if the change due is \$38.63, the number of specific bills and coins which constitute the change will be shown. If there is no \$10.00 bill in the cash till, the display 100 will be generated showing the specific number of available bills and coins which are to be distributed as the change due the customer as a result of the operator touching the ten dollar bill button. This operation may be repeated until a display is generated in which the currency is available for dispensing. It will be seen from this construction that the displays 90, 98 and 100 are dynamically changed in accordance with the type of payment selected by the customer and the currency available for dispensing as change and that the operator's task has been simplified from performing mental running totals to the counting of bills and coins. This simplification can in turn speed up the tendering process and increase transaction throughput.

Referring now to Figs. 20A and 20B, there is disclosed a flow diagram of the operation of the microprocessor 170 (Fig. 12) for controlling the movement of the highlight bar 52 as a result of touching the scroll buttons 46 and 48 (Fig. 7). The microprocessor 170, in response to the appearance of an encoded message (block 104) from the panel detector unit 34 (Fig. 3) indicating that the up arrow button 46 (Fig. 11C) has been touched (block 106), will determine if there is more text above the location which can be moved in an upward direction (block 108) and if there isn't, the microprocessor will proceed over line 110 and terminate the operation (block 112) (Fig. 20B). If there is more text above, the microprocessor will check to see if the highlight bar 52 (Fig. 11B) is on (block 114) and if it is not on, the microprocessor will proceed over line 116 and determine if the items in the receipt are to be scrolled either by line or by item (block 118) (Fig. 20B). If the items are to be scrolled item by item, the microprocessor will proceed over line 120 and scroll the text down by one item (block 122) and then proceed over line 124 to send a message to the application software that the item selection has changed (block 126) and then terminate the operation (block 128). If the scrolling is to be line by line, the microprocessor will scroll the text down by one line (block 129)

and then proceed over line 122 to block 128.

If the highlight bar 52 is on (block 114) (Fig. 20A), the microprocessor will determine whether the highlight bar is located at the top, middle, or bottom of the receipt 40 (block 130). If the highlight bar is at the top of the receipt 40 (Fig. 11B), the microprocessor will proceed over line 132 and determine if the receipt is to be scrolled by line or by item (block 134). If the scrolling is to occur item by item, the microprocessor will proceed over line 136 and scroll down the text in the receipt by one item (block 138) with the highlight bar staying at the top (Fig. 11B) (block 140) and then proceed over line 144 to block 126 and block 128. If the receipt is to be scrolled by line, the microprocessor will scroll down the text by one line (block 146) and then proceed over line 148 to block 140 positioning the highlight bar at the top of the electronic receipt. If the highlight bar is at the middle of the receipt (Fig. 11E), the microprocessor will determine if the receipt 40 is to be scrolled by line or by item (block 150). If the scrolling is to occur by line, the microprocessor will move the highlight bar up one line (block 152) and proceed over line 154 to block 126. If the text is to be scrolled item by item, the microprocessor will move the highlight bar up one item (block 156) and terminate the operation over line 154 to block 126 and block 128.

If the highlight bar 52 is at the bottom of the receipt (Fig. 11F), the microprocessor will proceed over line 157 and determine if the scrolling of the text is to be by line or by item (block 158) (Fig. 20B). If the scrolling is to occur by line, the microprocessor will move the highlight bar up one line (block 160) and terminate the operation through blocks 126 and 128. If the scrolling is to occur by item, the microprocessor will move the highlight up one item (block 162) and terminate the operation through blocks 126 and 128. It will be seen from this operation that by touching the up button 46 (Fig. 8), the highlight bar 52 will either move in a vertical direction to highlight one of the items in the receipt or the text will move through the stationary highlight bar depending on the location of the highlight bar. Touching the down arrow 48 (Fig. 11A) results in the opposite movement.

Referring now to Fig. 21, there is shown a flow diagram of the operation of the microprocessor 170 for determining the type of bills and coins that are to be displayed representing the payment options that the customer may present as payment for the amount due for the purchased merchandise items (Figs. 14-16). Upon the generation of the amount due 62 (Fig. 9) and knowing the number of buttons that are available for use in the displays (Fig. 14-16) together with the number of bills and coins that are available for dispensing (block 187) as listed in table 186 (Fig. 13A), the microprocessor 170 (Fig. 12) will store in the memory 172 (Fig. 12) a number equal to the number of different bills and coins that are available, will set

the denomination counter 174 (Fig. 12) to one representing the first currency denomination (zero) in table 186 (Fig. 13A), will set the button counter 176 to one and set the temporary (TEMP 1) counter 178 to one (block 188). The microprocessor will then check to see if the value of the count of the denomination counter 174 is less than the number of currency denominations available and that the value in the button counter 176 is less than the number of buttons available (block 190). If they are not, the microprocessor will end the operation (block 192).

If the counts in the counters 174 and 176 are less than the number of currency denominations available and the number of buttons available, the microprocessor will check to see if the value of the denomination counter 174 is equal to zero (block 194). If it is, the microprocessor will generate the button 64 (Figs. 14-16 inclusive) to display the bill denomination as the amount due for the purchased merchandise (block 196). With this arrangement, the button 64 (Figs. 14-16 inclusive) will always be generated to display the amount due. If the denomination counter 174 is not equal to zero, the value of the bill being processed will be set equal to the currency denomination listed in table 186 (Fig. 13A) corresponding to the count in the counter 174 (block 198) and the microprocessor will increment the counter by one which represents the next currency denomination that is listed in the table 186 (block 200). The microprocessor will then determine what amount will be displayed as the next tendering option. This is accomplished by determining the number of the designated bills that are needed to pay off the amount due. To find this value, the microprocessor divides the value of the bill into the amount due and adds one to this value if the division had a remainder. This operation is represented by the term "AMT DUE MOD BILL" in block 202. If this resulting value is equal to zero (block 202), meaning that there was no remainder after the bill denomination is divided into the amount due, the microprocessor will set this value in the TEMP 2 counter 179 (Fig. 12) as the amount due (block 204) and check (block 208) to see if this value is greater than the value set in the TEMP 1 counter 178 (Block 188). If there is a remainder which is not equal to zero (block 202), the microprocessor will set a value in the TEMP 2 counter 180 equal to the bill denomination times a value equal to the number of times the bill denomination can be divided into the amount due plus one (block 206). This value is represented by the term "AMT DUE DIV BILL + 1" in block 206. The microprocessor will then compare the value in the TEMP 2 counter 180 with the value in the TEMP 1 counter 178 (block 208) and if it is greater, the touch screen panel 22 will display the bill denomination in one of the buttons 66, 68 (Figs. 14-16 inclusive) as one of the bills which may be submitted by the customer as payment for the amount due (block 214). If the value in the

TEMP 2 counter is not greater than the value in the TEMP 1 counter, the microprocessor will proceed over the lines 210 and 212 and check to see if the value in the denomination counter 174 is less than the number of currency denominations available and that the number of buttons in the cash till compartments 92 and 94 (Fig. 17) is less than the number of buttons available (block 190). This process is repeated if necessary using the currency denominations listed in Table 182 (Fig. 13A) to provide the payment options shown in Figs. 14-16 inclusive.

Referring now to Fig. 22, there is shown a flow diagram of the operation of the microprocessor for generating the displays shown in Figs. 18 and 19 representing the particular bills and coins constituting the change which is to be given to the customer. The microprocessor 170, knowing the amount of change that is due as a result of subtracting the amount due from the bill tendered by the customer and the currency (bills and coins) that is available (block 220), will check to see if the change due is equal to zero (block 222) and if it is not, will generate the display 98 (Fig. 18) with the compartments 92, 94 shown as empty (block 224) which ends the operation.

If the change due is greater than zero (block 222), the microprocessor will set the denomination counter 174 (Fig. 12) to one (block 226) representing the first currency denomination in column 184 of table 183 (Fig. 13B) which in the present example is twenty. The microprocessor will then generate a number representing the change due divided by the currency denomination selected in block 226 (block 228) and check to see if that number is greater than zero (block 230). If the number is not greater than zero, the microprocessor will proceed over line 232 and increment the counter 174 (Fig. 12) by one (block 234) and then determine (block 240) if the new number representing the currency denomination is larger than the number of elements in the denomination column 184 of the Table 183 (Fig. 13B). If it is larger, the microprocessor will end the operation (block 244). If it is not larger, the microprocessor will proceed over line 242 and generate a new number as determined in block 228 representing the number of times the value of the currency denomination goes into the change due. If this number (block 230) is greater than zero, the microprocessor will output this number or value to the particular compartment location 92, 94 (Figs. 18 and 19) (block 236) comprising a button representing the specific number of its associated currency denomination which is to be dispensed as part of the change due. The microprocessor will then establish a new change due (block 238) by subtracting from the original change a value representing the amount to be dispensed as found in block 236. The microprocessor will then increment the counter 174 (block 234) by one and then proceed to block 240 to determine if the new bill denomination is greater than the available

currency elements. If it is not, the microprocessor will proceed over line 242 to block 228 to determine the number of times the new currency denomination goes into the new change due as found in block 238. This sequence is repeated until the display 98 (Fig. 18) is generated.

It will be seen that upon the generation of the amount of change due the customer for the particular bill denomination presented by the customer, the displays 98 (Fig. 18) and 100 (Fig. 19) will display buttons representing the particular bill and coin denominations that are available and the number of such denominations which constitute the change due to the customer, utilizing the minimum amount of keystrokes by the checkout operator to accomplish this result.

Claims

1. Apparatus (20) for processing the payment for at least one purchased merchandise item comprising display means (24,62) for displaying the amount due for the purchase of said at least one item, characterized in that said display means (24,62) is arranged to display a plurality of payment amounts that may be tendered by the customer as payment for said at least one item having regard to the amount due, and in that there are provided means (36) arranged to calculate the amount of change in response to the selection of one of the displayed amounts corresponding to the amount tendered. 20
2. Apparatus according to claim 1, characterized in that said display means (24,62) is a touch sensitive screen (22). 25
3. Apparatus according to claim 1 or 2, characterized in that said display means (26,62) is arranged to display a receipt representation including a listing of said at least one item. 30
4. Apparatus according to claim 3, characterized by means for superimposing a first designated area (44,48) on said receipt representation which when touched will move said at least one item in the receipt representation. 35
5. Apparatus according to any one of the preceding claims, characterized by means (90,98,100) for displaying a representation of each of the bill and coin denominations together with the number of such denominations which comprises any change due the customer having regard to the amount tendered. 40
6. Apparatus according to claim 5, characterized in that said means (90,98,100) for 45

displaying the bill and coin denominations is arranged to display a representation of a cash till of the apparatus with the bill and coin denominations represented in respective compartments. 5

7. Apparatus according to claim 5 or 6, characterized in that said means (90,98,100) for displaying the bills and coin denominations includes means (100) for displaying the images of only those bill and coin denominations which are available for distribution as change due. 10
8. Apparatus according to claim 7, characterized in that said means for displaying the bill and coin denominations includes means for dividing each of the available currency denominations into the change due to generate said number. 15
9. A method of processing the payment for at least one purchased merchandise item comprising displaying the amount due for the purchase of said at least one item, characterized by the steps of storing a listing of all the currency denominations available for said payment, dividing said amount due by each currency denomination, adding one to the quotient whenever a remainder is generated as a result of the division, multiplying said denominations by the respective quotient plus one values obtained for each denomination, displaying the products obtained by the multiplication as possible payment amounts that may be tendered by a customer and calculating the amount of change due in response to selection of one of said displayed amounts corresponding to the amount tendered. 20
10. A method according to claim 9, characterized by the steps of displaying the amount due as the amount that may be tendered by the customer when said quotient is generated without a remainder. 25

FIG. 1

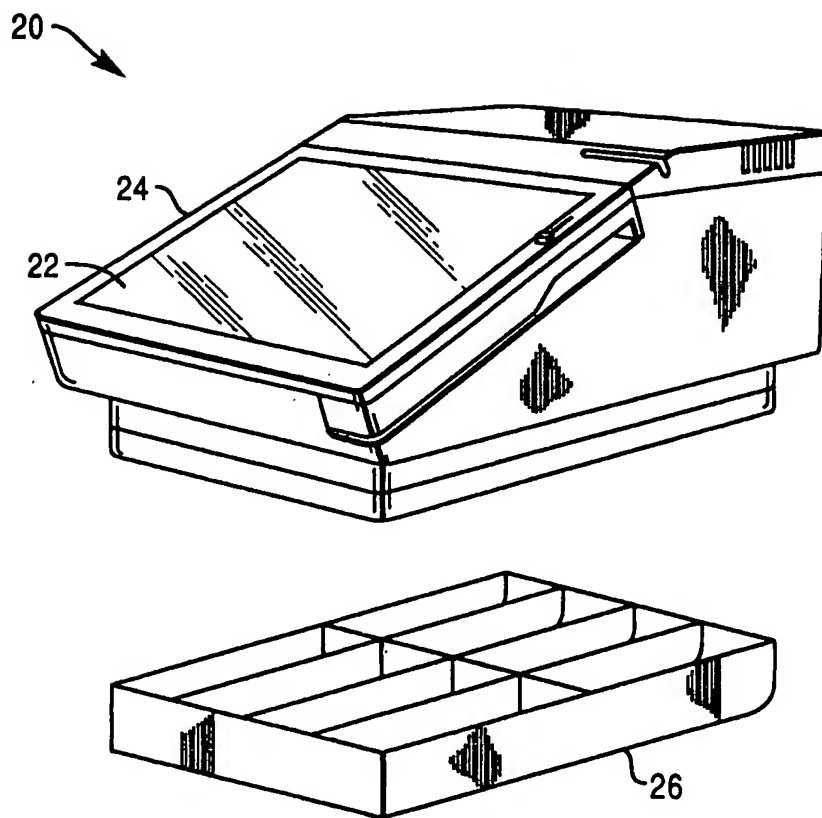


FIG. 2

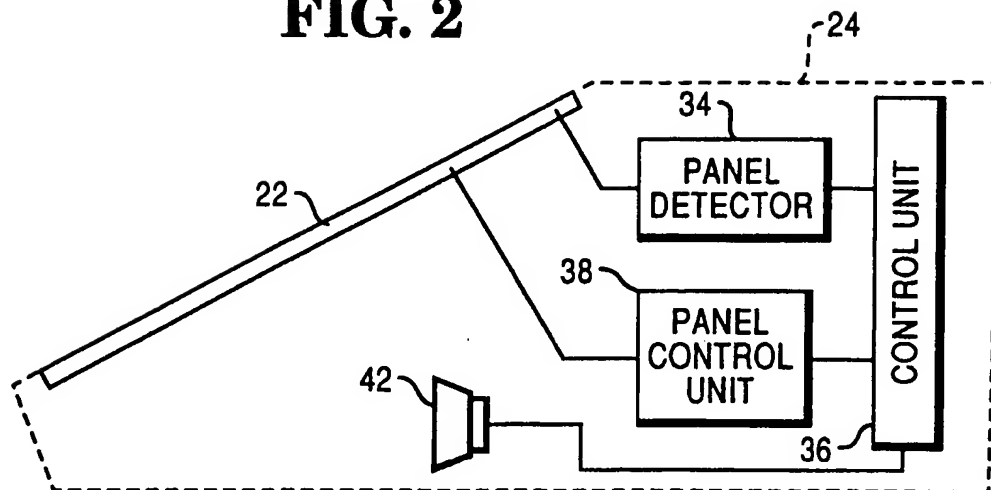


FIG. 8

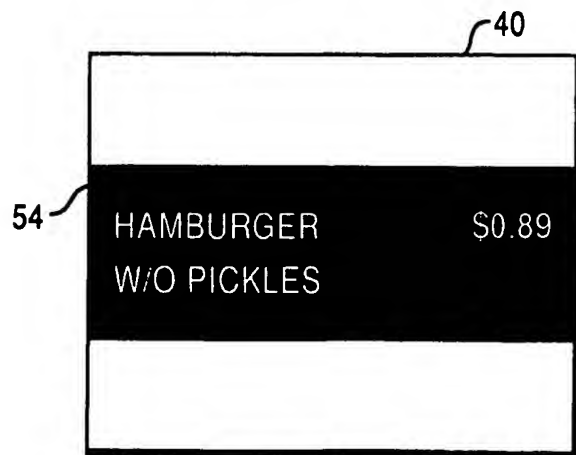


FIG. 3

HAMBURGER	\$0.89
CHEESEBURGER	\$1.09
LARGE FRIES	\$0.79
MEDIUM DRINK	\$0.75

40

42

43

FIG. 4

HAMBURGER	\$0.89
W/O PICKLES	
CHEESEBURGER	\$1.09
LARGE FRIES	\$0.79
MEDIUM COKE	\$0.75

40

44

FIG. 5

HAMBURGER	\$0.89
CHEESEBURGER	\$1.09
LARGE FRIES	\$0.79
MEDIUM COKE	\$0.75

40

52

FIG. 6

HAMBURGER	\$0.89
W/O PICKLES	
CHEESEBURGER	\$1.09
LARGE FRIES	\$0.79
MEDIUM COKE	\$0.75

40

54

FIG. 7

HAMBURGER	\$0.89
CHEESEBURGER	\$1.09
LARGE FRIES	\$0.79
MEDIUM COKE	\$0.75

40

46

50

48

FIG. 9

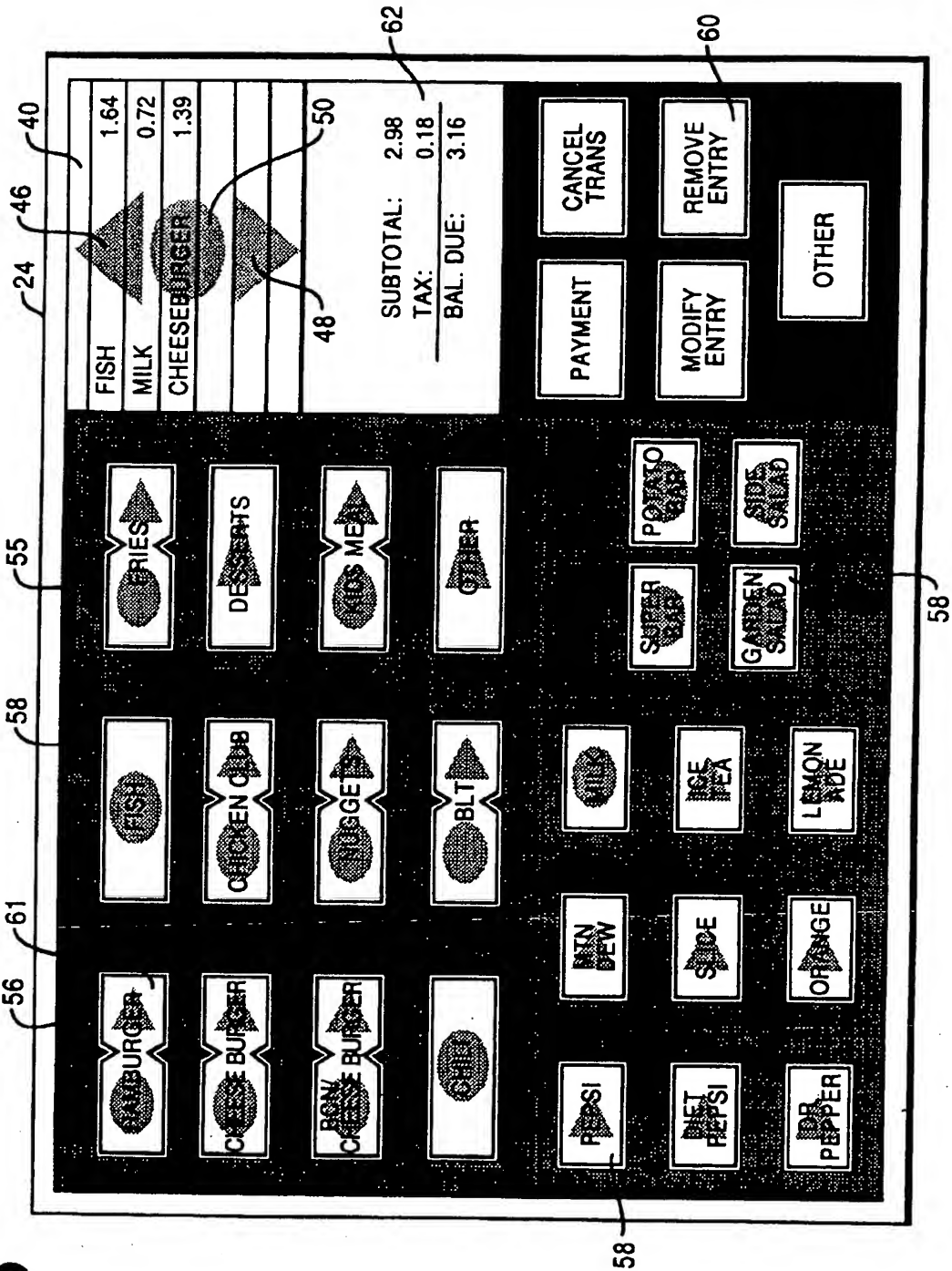


FIG. 10

24 40 46 48 50 60 62 63 65

FISH	1.64
MILK	0.72
CHEESEBURGER	1.39

SUBTOTAL: 2.98
TAX: 0.18
BAL. DUE: 3.16

CANCEL TRANS
PAYMENT
MODIFY ENTRY
REMOVE ENTRY
OTHER

FIG. 11A

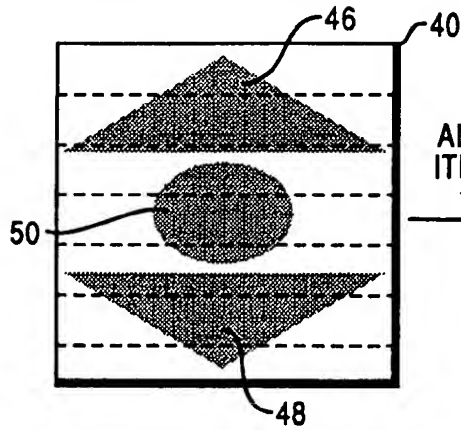


FIG. 11B

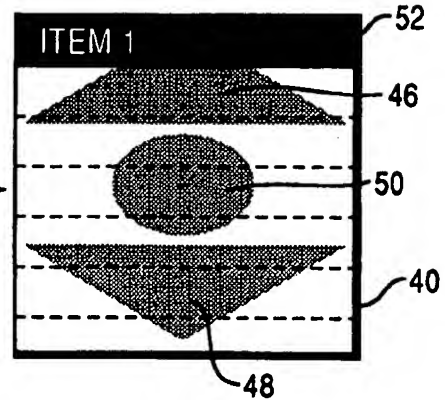


FIG. 11C

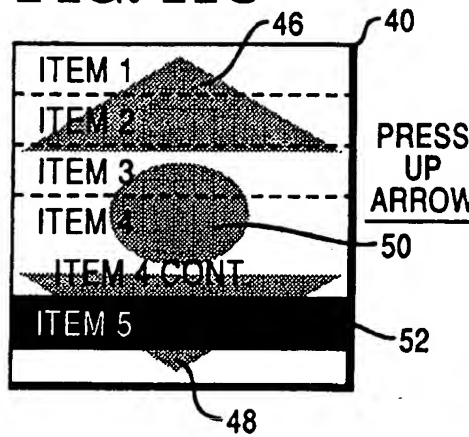


FIG. 11D

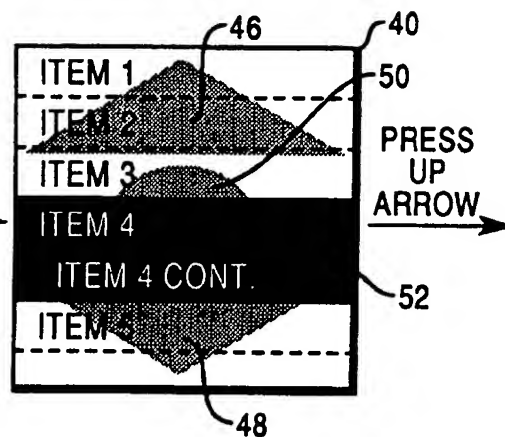


FIG. 11E

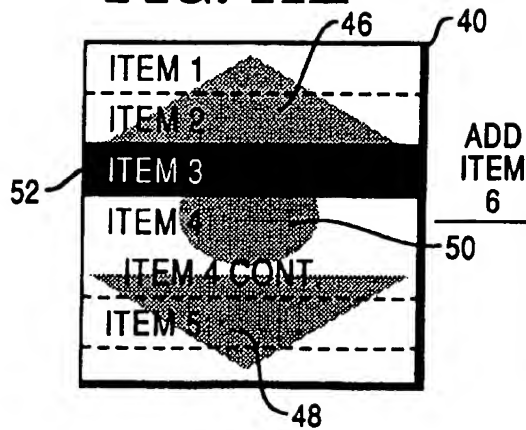


FIG. 11F

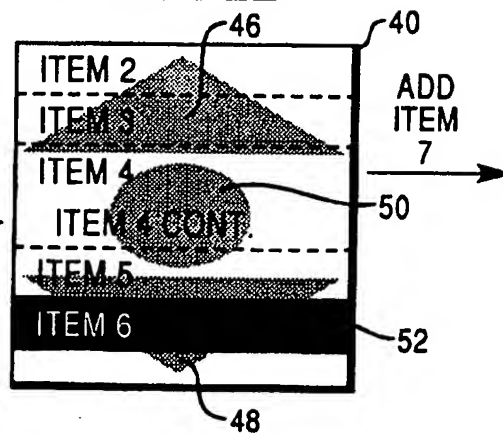
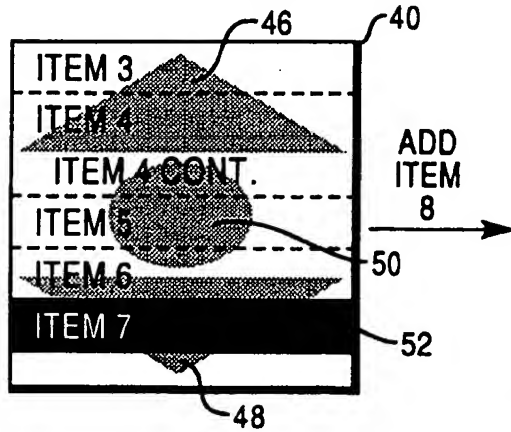
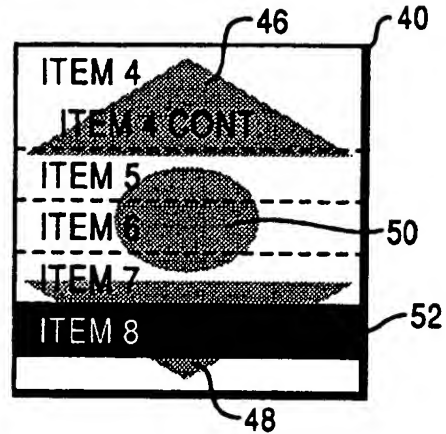
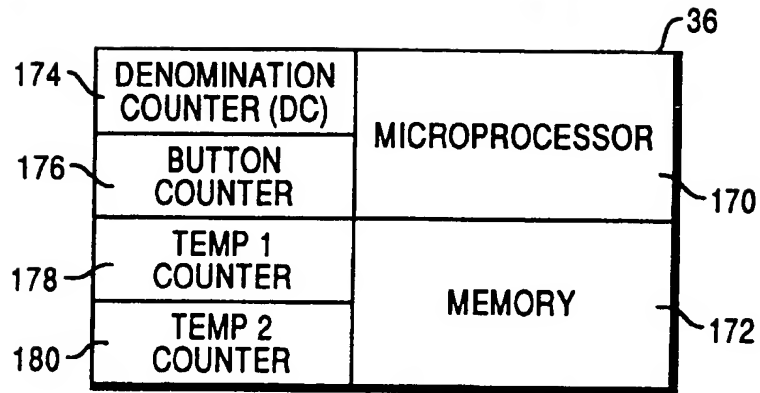


FIG. 11G**FIG. 11H****FIG. 12****FIG. 13A**

REF DC	CURRENCY DENOMINATION
1	0
2	.01
3	.05
4	.10
5	.25
6	.50
7	1.00
8	5.00
9	10.00
10	20.00

FIG. 13B

REF DC	CURRENCY DENOMINATION
1	20.00
2	10.00
3	5.00
4	1.00
5	.50
6	.25
7	.10
8	.05
9	.01

FIG. 14

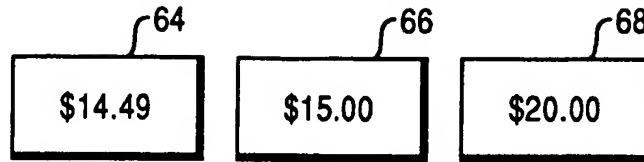


FIG. 15

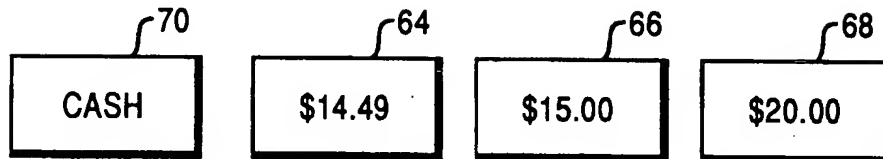


FIG. 16

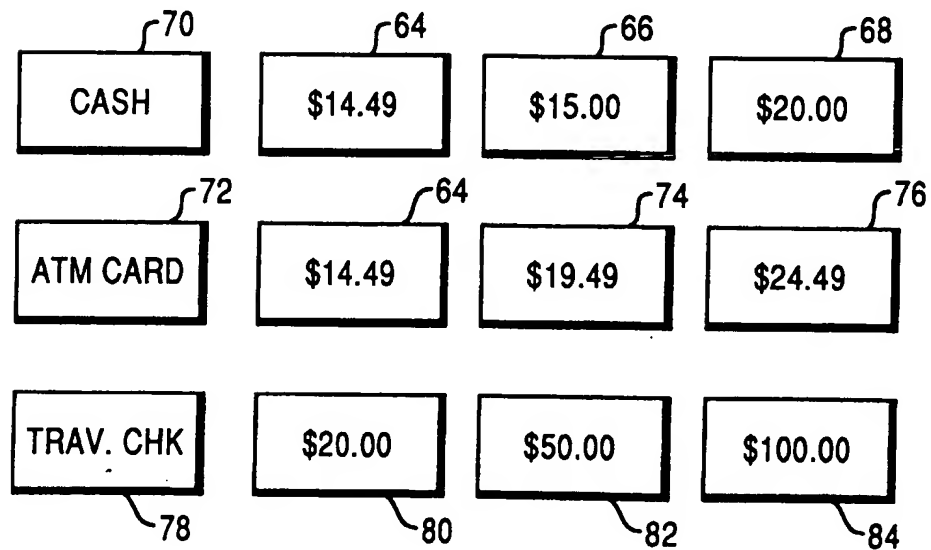


FIG. 17

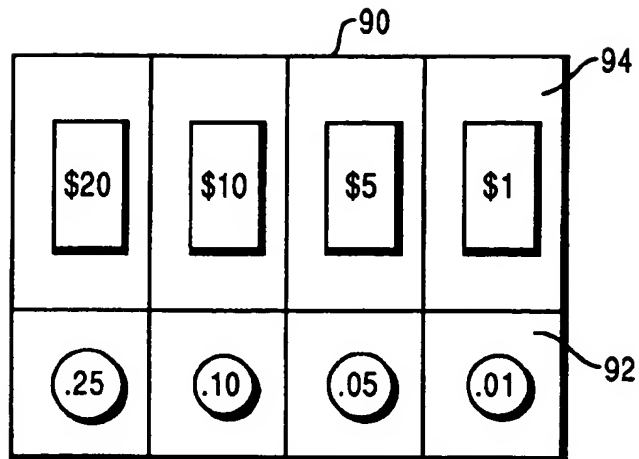


FIG. 18

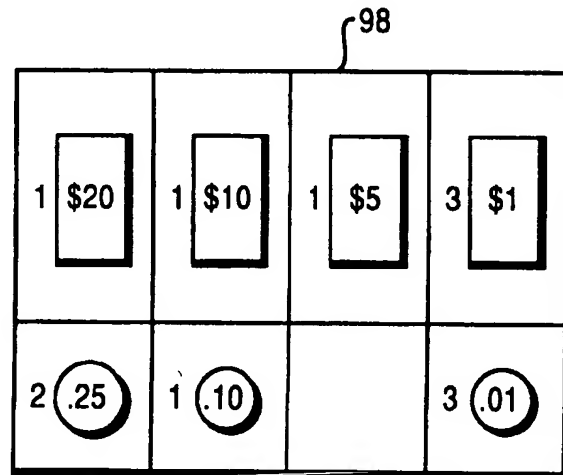


FIG. 19

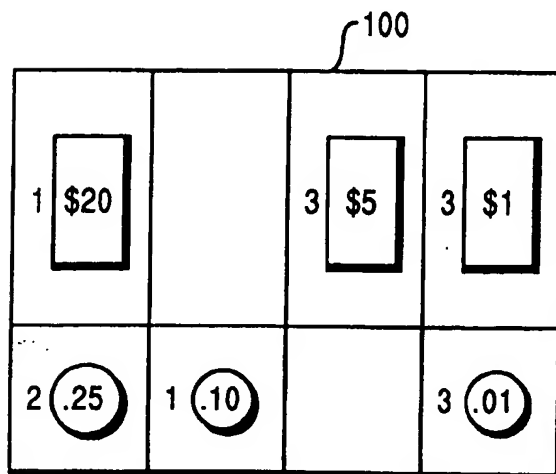


FIG. 20A

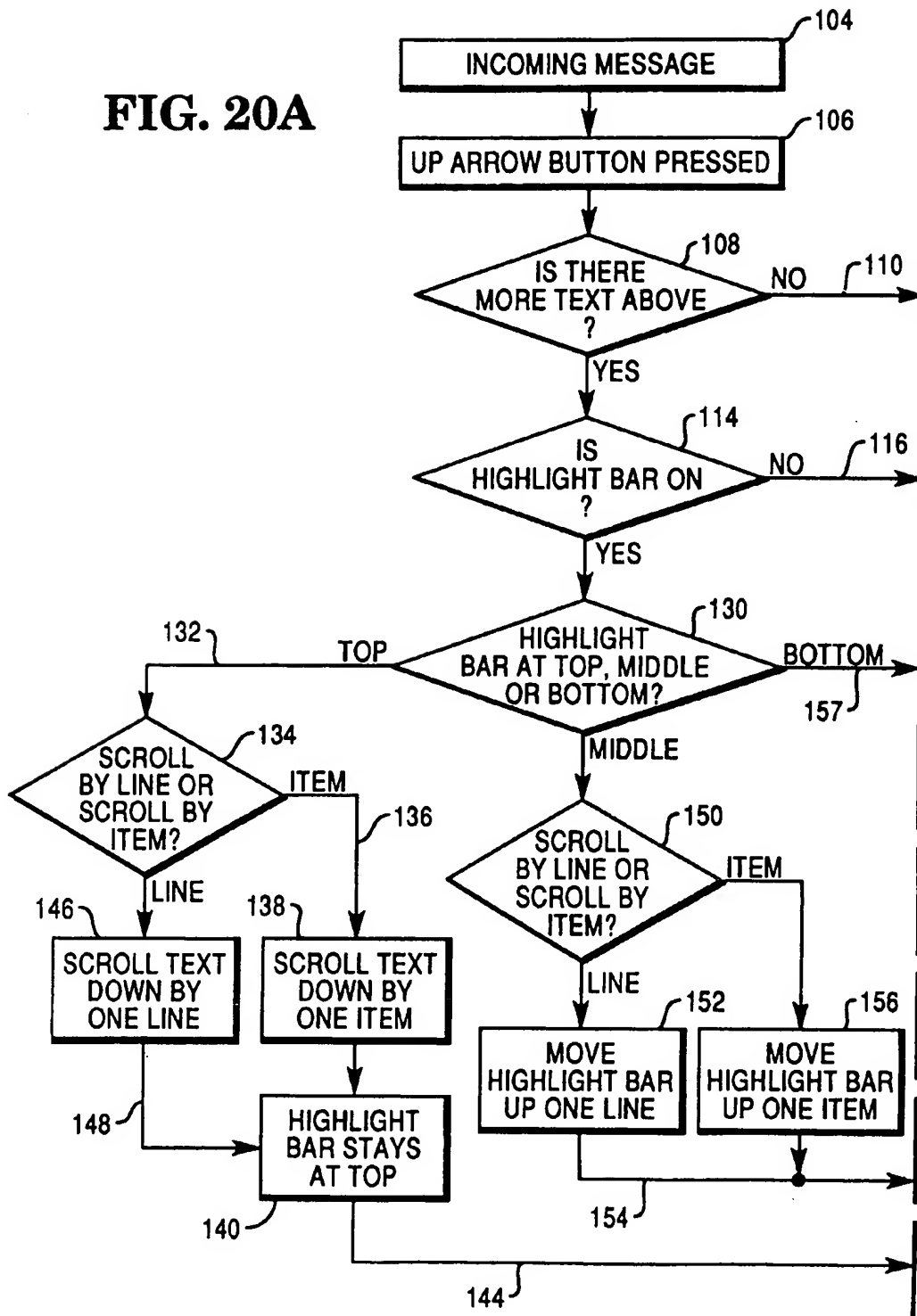


FIG. 20B

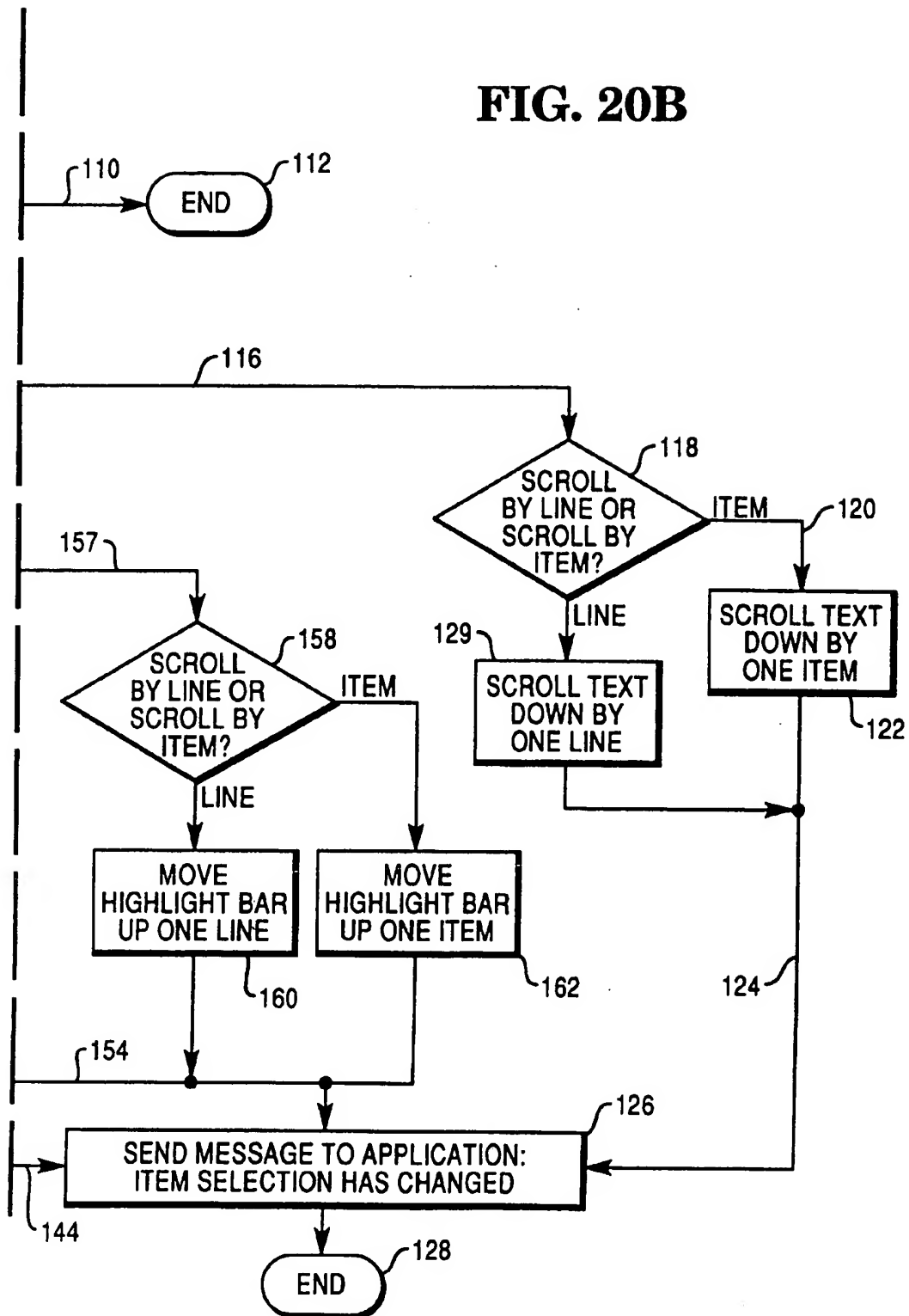


FIG. 21

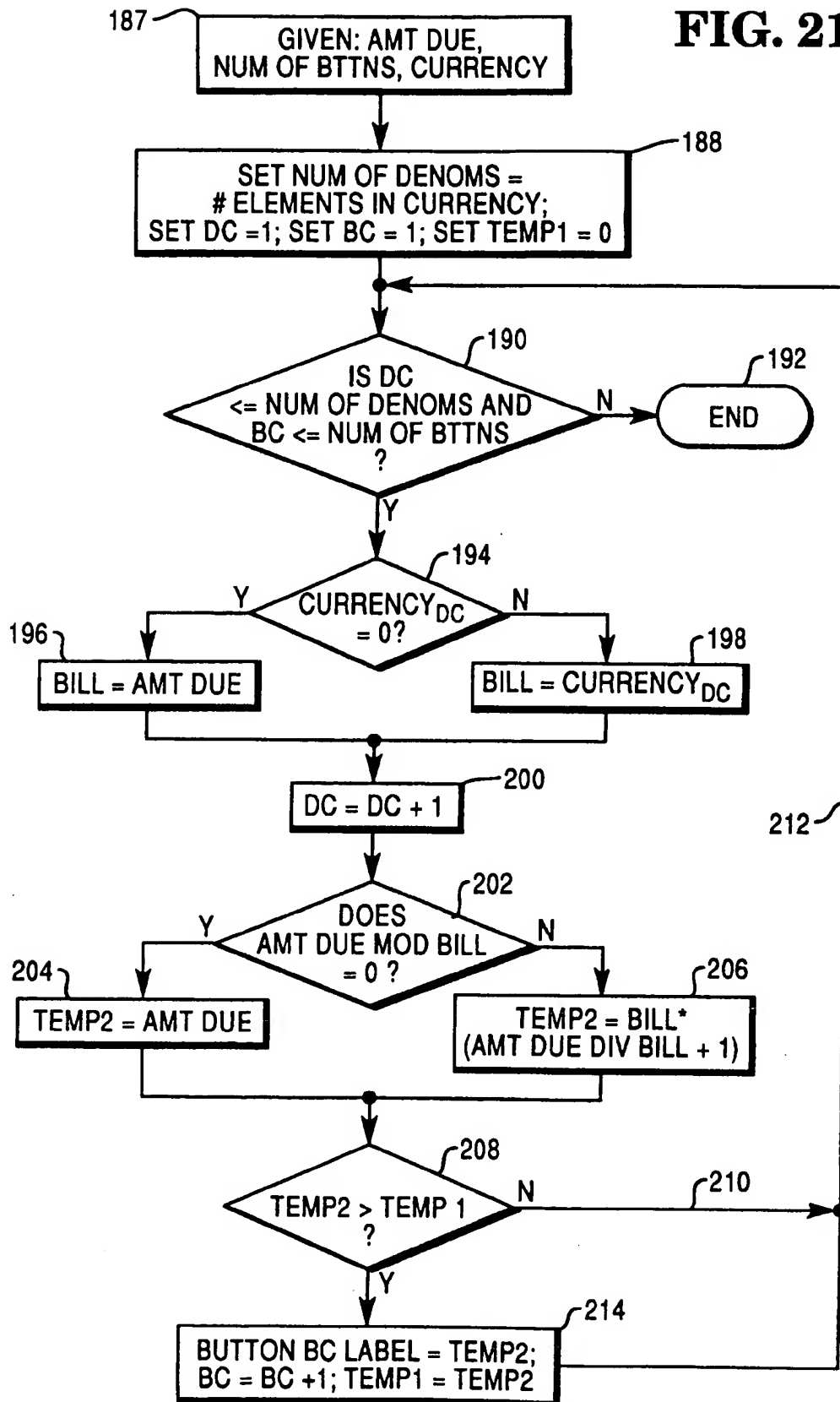
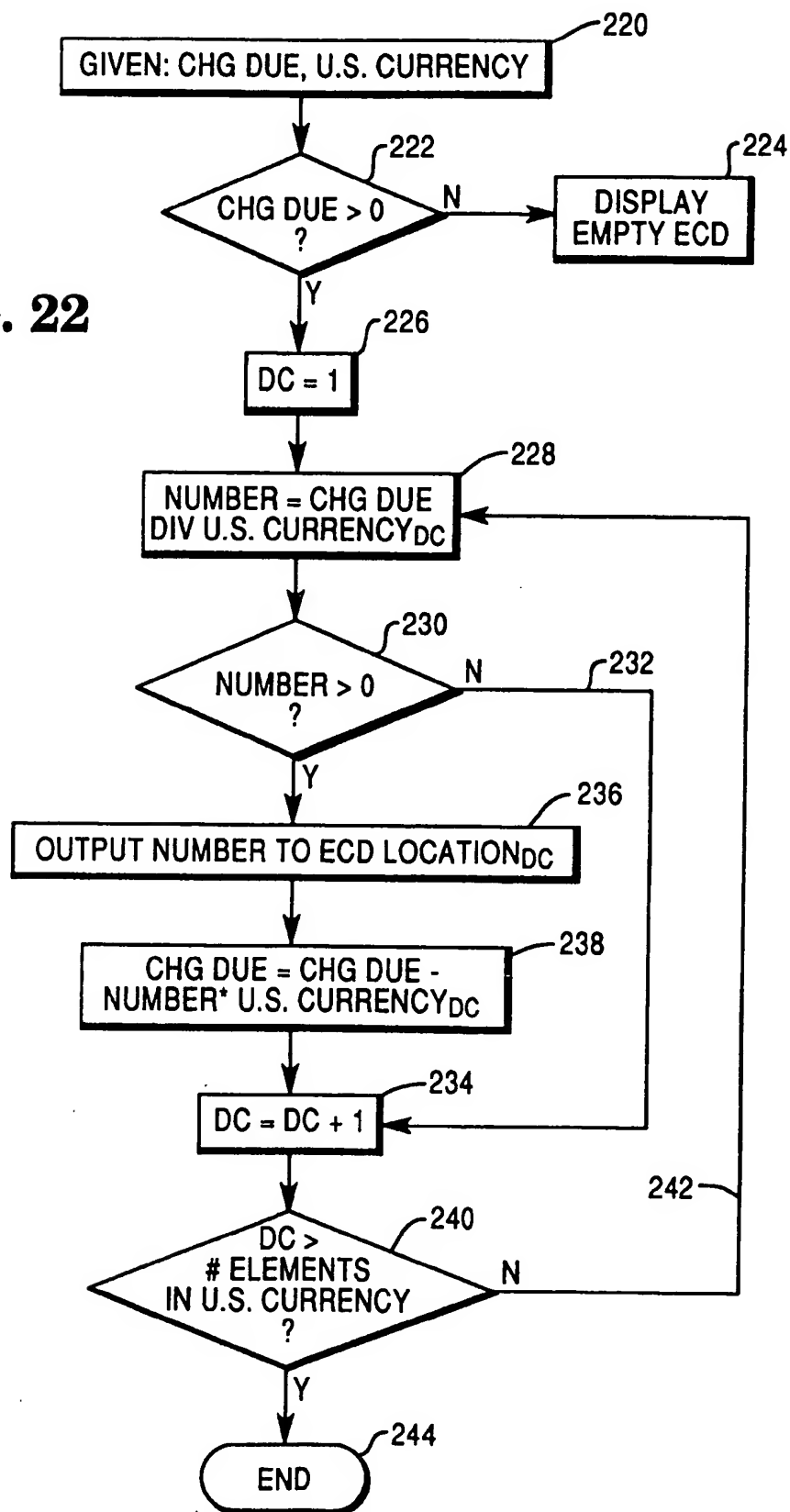


FIG. 22



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